

Application No. 10/609,005

Response dated October 21, 2005

Reply to Office action of September 28, 2005

BEST AVAILABLE COPY Page 2 of 14**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-35. (canceled)

36-51. (canceled)

52. (previously presented) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet by diminishing internal kinetic energy of the droplet without solidifying the droplet; and
cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere;
wherein cooling the droplet includes
enclosing the droplet in a gaseous medium; and
controlling the temperature of the gaseous medium.

53. (previously presented) The process of claim 52, wherein controlling the temperature of the gaseous medium includes providing a first fluid at least partially surrounding the gaseous medium.

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54. (previously presented) The process of claim 53, wherein controlling the temperature of the gaseous medium includes dispersing a second fluid within the first fluid.

55. (previously presented) The process of claim 54, wherein dispersing the second fluid within the first fluid includes dispersing the second fluid through a plurality of holes in a dispersal tube.

56. (previously presented) The process of claim 54, wherein the first fluid has a first temperature, and the second fluid has a second temperature.

57. (previously presented) The process of claim 52, further comprising collecting the metal sphere.

58. (previously presented) The process of claim 57, wherein collecting the metal sphere includes

receiving the metal sphere in a reservoir that holds a liquid;

receiving the metal sphere and a volume of the liquid in a pipe; and

delivering the metal sphere to a collection basket.

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59. (previously presented) The process of claim 58, wherein receiving the metal sphere and a volume of the liquid in a pipe includes allowing the metal sphere to slide down lower sides of the reservoir that slope toward an opening in the pipe.

60. (previously presented) The process of claim 58, wherein receiving the metal sphere and a volume of the liquid in a pipe includes allowing the metal sphere to settle in a bend in the pipe.

61. (previously presented) The process of claim 58, wherein delivering the metal sphere to the collection basket includes
pumping the metal sphere and the volume of the liquid to a level that is higher than a level of the liquid in the reservoir, and
depositing the metal sphere and the volume of the liquid into the collection basket.

62. (previously presented) The process of claim 61, wherein collecting the metal sphere further includes disposing the collection basket in a holding tank.

63. (previously presented) The process of claim 62, wherein collecting the metal sphere further includes
removing the collection basket from the holding tank, and

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allowing the volume of the liquid to pass through openings in the collection basket that are smaller than the metal sphere.

64. (previously presented) The process of claim 62, wherein collecting the metal sphere further includes returning the liquid passing through the openings in the collection basket to the reservoir.

65. (previously presented) The process of claim 57, wherein returning the liquid to the reservoir includes providing a return channel in fluid communication between the holding tank and the reservoir.

66. (previously presented) The process of claim 52, wherein buffering the droplet includes
enclosing the droplet in a buffering gaseous medium that is separate from the gaseous medium in which the cooling occurs, and
controlling the temperature of the buffering gaseous medium.

67. (previously presented) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet by diminishing internal kinetic energy of the droplet without solidifying the droplet, in a first medium at a first temperature;

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cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere, in a second medium at a second temperature; and

blowing a fluid in a space between the first medium and the second medium to provide temperature separation between the first medium and the second medium.

68. (previously presented) The process of claim 67, further comprising collecting the metal sphere.

69. (previously presented) The process of claim 68, wherein collecting the metal sphere includes

receiving the metal sphere in a reservoir that holds a liquid;
passing the metal sphere and a volume of the liquid to a pipe; and
delivering the metal sphere from the pipe to a collection basket.

70. (previously presented) The process of claim 69, wherein passing the metal sphere and a volume of the liquid to a pipe includes allowing the metal sphere to slide down lower sides of the reservoir that slope toward an opening in the pipe.

71. (previously presented) The process of claim 69, wherein passing the metal sphere and a volume of the liquid to a pipe includes allowing the metal sphere to settle in a bend in the pipe.

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72. (previously presented) The process of claim 69, wherein delivering the metal sphere from the pipe to a collection basket includes
pumping the metal sphere and the volume of the liquid to a level that is higher than a level of the liquid in the reservoir, and
depositing the metal sphere and the volume of the liquid into the collection basket.

73. (previously presented) The process of claim 72, wherein collecting the metal sphere further includes disposing the collection basket in a holding tank.

74. (previously presented) The process of claim 73, wherein collecting the metal sphere further includes removing the collection basket from the holding tank, and
allowing the volume of the liquid to pass through openings in the collection basket that are smaller than the metal sphere.

75. (previously presented) The process of claim 74, wherein collecting the metal sphere further includes returning the liquid passing through the openings in the collection basket to the reservoir.

76. (previously presented) The process of claim 75, wherein returning the liquid to the reservoir includes providing a return channel in fluid communication between the holding tank and the reservoir.

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77. (previously presented) The process of claim 67, wherein the first medium is a gaseous medium, and buffering the droplet includes controlling the first temperature.
78. (previously presented) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet in a first medium by diminishing internal kinetic energy of the droplet without solidifying the droplet;
passing the buffered droplet through a gas screen; and
cooling the buffered droplet in a second medium to the extent that the droplet solidifies into a metal sphere;
wherein the gas screen includes a moving fluid medium that provides temperature separation between the first medium and the second medium.
79. (previously presented) The process of claim 78, wherein a temperature of the first medium is greater than a temperature of the second medium.
80. (previously presented) The process of claim 78, wherein the first medium is disposed above the second medium.

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81. (previously presented) The process of claim 78, further comprising collecting the metal sphere.

82-84. (canceled)

85. (previously presented) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet to diminish internal kinetic energy of the droplet without solidifying the droplet; and

cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere, including

surrounding the droplet in a gaseous medium,

at least partially enclosing the gaseous medium in a first fluid, and

dispersing a second fluid within the first fluid through a plurality of holes in a dispersal tube.

86. (previously presented) The process of claim 85, wherein the first fluid is a liquid, and the second fluid is a gas.

87. (previously presented) The process of claim 85, wherein the first fluid is liquid nitrogen.

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88. (previously presented) The process of claim 85, wherein the second fluid is a gas mixture of hydrogen in nitrogen.

89. (previously presented) The process of claim 85, wherein buffering the droplet takes place in a buffering medium; cooling the droplet takes place in a cooling medium; and the buffering medium is disposed above the cooling medium.

90. (previously presented) The process of claim 89, further comprising collecting the metal sphere.

91. (previously presented) A process for fabricating metal spheres, comprising: generating a droplet from a molten metal mass; ejecting the droplet at a generally upward angle, such that the droplet follows a trajectory that proceeds upward until the droplet reaches a maximum height before descending;

buffering the droplet by providing a generally upward flow of gas that slows a rate of descent of the droplet as the droplet is descending and diminishes internal kinetic energy of the droplet without solidifying the droplet; and

cooling the buffered droplet to an extent that the droplet solidifies into a metal sphere.

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92. (previously presented) The process of claim 91, wherein buffering the droplet includes controlling the temperature of the gas.

93. (previously presented) The process of claim 91, further comprising collecting the metal sphere.

94. (previously presented) The process of claims 91, wherein collecting the metal sphere includes

allowing the metal sphere to fall into a reservoir that holds a liquid;
receiving the metal sphere and a volume of the liquid from the reservoir in a pipe connected to a bottom end of the reservoir; and
delivering the metal sphere to a collection basket.

95. (previously presented) The process of claim 94, wherein receiving the metal sphere and a volume of the liquid from the reservoir in a pipe includes allowing the metal sphere to slide down lower sides of the reservoir that slope toward an opening in the pipe.

96. (previously presented) The process of claim 94, wherein receiving the metal sphere and a volume of the liquid from the reservoir in a pipe includes allowing the metal sphere to settle in a bend in the pipe.

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97. (previously presented) The process of claim 94, wherein delivering the metal sphere to the collection basket includes

pumping the metal sphere and the volume of the liquid to a collection level that is higher than a level of the liquid in the reservoir, and

depositing the metal sphere and the volume of the liquid into the collection basket.

98. (previously presented) The process of claim 97, wherein collecting the metal sphere includes

disposing the collection basket in a holding tank; and

allowing the volume of the liquid to pass through openings in the collection basket that are smaller than the metal sphere.

99. (previously presented) The process of claim 98, wherein collecting the metal sphere further includes returning the liquid passing through the openings in the collection basket to the reservoir.

100. (previously presented) The process of claim 99, wherein collecting the metal sphere further includes providing a return channel in fluid communication between the holding tank and the reservoir.

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101. (previously presented) The process of claim 98, wherein collecting the metal sphere further includes removing the collection basket from the holding tank.

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